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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LAZORCIK, JASON L	

ART UNIT	PAPER NUMBER
1791	

MAIL DATE	DELIVERY MODE
12/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/677,087	**Applicant(s)** TUDRYN ET AL.	
	Examiner Jason L. Lazorcik	**Art Unit** 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17 and 19-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 19-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *10/04/2007*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

The request for a continued prosecution application (CPA) under 37 CFR 1.53(d) filed on October 4, 2007 is acknowledged. 37 CFR 1.53(d)(1) was amended to provide that the CPA must be for a design patent and the prior application of the CPA must be a design application that is complete as defined by 37 CFR 1.51(b). See *Elimination of Continued Prosecution Application Practice as to Utility and Plant Patent* Applications, final rule, 68 *Fed. Reg.* 32376 (May 30, 2003), 1271 *Off. Gaz. Pat. Office* 143 (June 24, 2003). Since a CPA of this application is not permitted under 37 CFR 1.53(d)(1), the improper request for a CPA is being treated as a request for continued examination of this application under 37 CFR 1.114.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 21 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. After careful review of Applicants originally filed disclosure, the Examiner has been unable to find sufficient basis to support the presently claimed limitation which requires in part that "the first substrate is formed of a single material." Restated, it is not evident from the disclosure as originally filed that Applicant has sufficient basis to exclude the use of substrates formed of more than one material.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5, 6, 7, 8, 10, 11, 16, 19, 20, and 21 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Rohwer et. al. (Mat. Res. Soc. Symp. Proc. Vol. 729 (2002) pp U5.7.1-U5.7.6).

In Brief, Rohwer teaches a method of anodic bonding silicon or poly-silicon substrates to glass substrates as a means to package MicroElectroMechanical (MEMS) based devices [**Claim 16, 19, 20**]. The reference explicitly teaches that the bonding step is performed under applied voltages up to 1000V with temperatures ranging from 280°C to 400°C under vacuum. With particular attention to the glass to polysilicon bonding trials listed in Table 1 (see page U.6.7.6), the authors teach bonding tempertures from 220°C to 260°C [**Claim 7**], bonding voltages from 600 to 750 V [**Claim 11**], and RMS surface roughness values of 10-11 nm [**Claims 8, 10**]. The authors further instruct that in bonding to silicon and polysilicon substrates, Pyrex 7740 is typically utilized as the glass substrate due to its CTE compatibility with silicon [**Claim 5, 6**].

It is the Examiners position that at least the polysilicon substrate in the Rohwer reference would be characterized by an elastic modulus of "about 150 gigaPascals" as required by independent claims 1 and 17. This position is supported by the evidentiary reference to Gupta et. al (SPIE 1996 Conference, volume 2880: Microlithography and Metrology in Micromachining II, October 14-15, 1996, pp1-7) which teaches (see table 3, page 7) that polysilicon substrates exhibit an elastic modulus in the range of 149 to 155 GPa +/- 10GPa.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

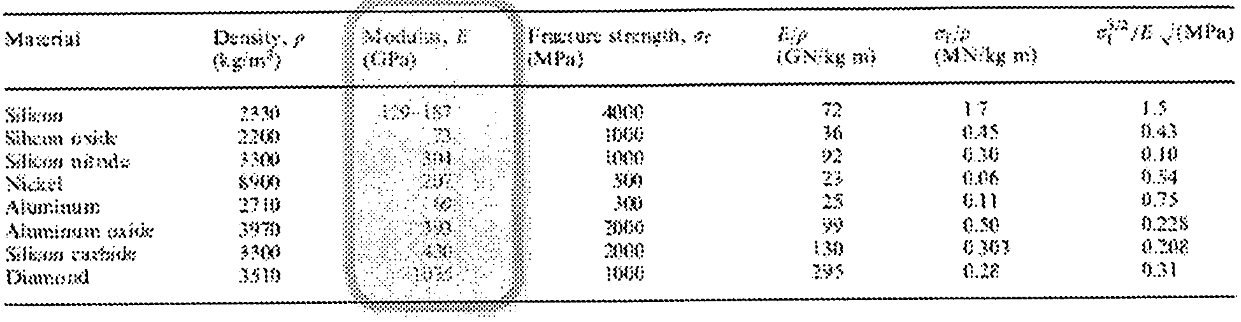
1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-3 and 5-11, are rejected under 35 U.S.C. 103(a) as being unpatentable over Berthold et. al. (Sensors and Actuators 82, 224–228,(2000)) in view of Fukushima (PCT/JP03/00570). Briefly, Berthold reviews the anodic bonding of Pyrex 7440 glass layers with one or two intermediate layers.

Specifically with respect to **Claims 1, 2, 3, 5, 6, 7, 8, 9, 10, 11**, Berthold teaches;

1. Providing a first material or "**a first layer**" comprising glass (pg 225, ¶2) or Pyrex 7440. Corning Pyrex 7440 is understood to be an acceptable borosilicate glass (Specification pg 6, Line 16).
2. Depositing silicon carbide by PECVD or "plasma enhanced chemical vapor deposition" on a second Pyrex 7440 substrate (Pg 225, ¶2) which is read as providing a second material or "**a first substrate**" having an elastic modulus greater than about 150 GPa. It is noted that silicon carbide is understood to posess an elastic modulus of 430 GPa (see Table 2 excerpt below) as disclosed by Spearing (Acta. Mater. 48, 179-196, (2000)). Restated, since at least the silicon carbide portion of the second material would inherently have an elastic modulus greater than about 150 gigaPascals, the instant reference is read in the broadest reasonable terms as providing "**a first substrate** having an elastic modulus greater than about 150 gigaPascals".

Table 2. Material performance indices for mechanical elements applied to microfabricatable materials, where possible data from microfabricated structures are used. Note the fracture strength data are the most subject to variation



Material	Density, ρ (kg/m^3)	Modulus, E (GPa)	Fracture strength, σ_f (MPa)	E/ρ (GN/kg m)	σ_f/ρ (MN/kg m)	$\sigma_f^{3/2}/E$ $\sqrt{(MPa)}$
Silicon	2330	129–187	4000	72	1.7	1.5
Silicon oxide	2200	73	1000	36	0.45	0.43
Silicon nitride	3300	304	1000	92	0.30	0.10
Nickel	8900	207	500	23	0.06	0.54
Aluminium	2710	69	300	25	0.11	0.75
Aluminium oxide	3970	393	2000	99	0.50	0.228
Silicon carbide	3300	430	2000	130	0.303	0.208
Diamond	3510	1035	1000	295	0.28	0.31

3. The first layer and first substrate are contacted and a voltage is applied between the first layer and the silicon carbide surface or "**first surface**" of the first substrate to cause an effective anodic bond (See Figure 1 excerpt) "directly between the first layer and the first substrate" and leaving "**a second surface**" of of the first substrate, which is "substantially opposite the first face", "substantially exposed after anodic bonding".

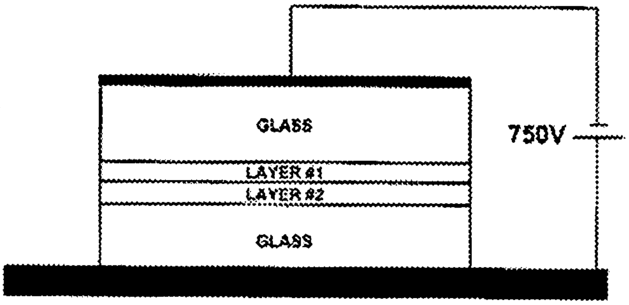


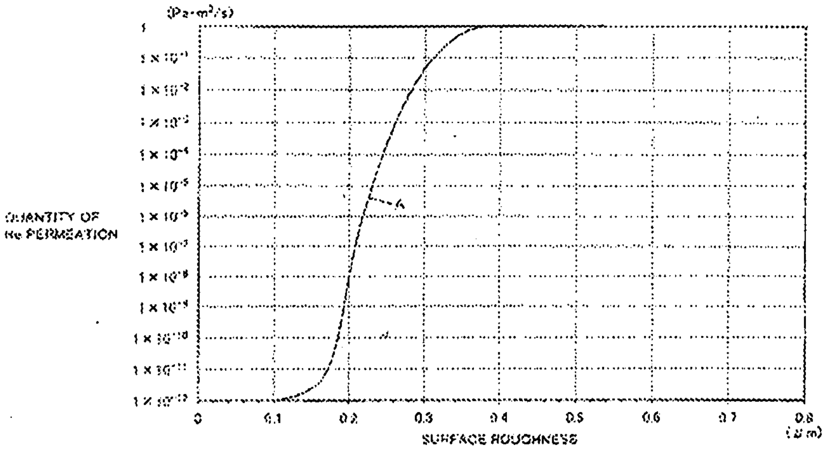
Fig. 1. Anodic bonding set-up.

It is further noted (Pg 224, ¶2) that bonding "temperatures not exceeding 400°C" or not exceeding ***about 350°C*** and "voltages of around 700V have resulted in successful bonding." Table 3 explicitly sets forth the ranges of experiments undertaken in the immediate reference, and of particular note for the immediate claim is the case wherein *layer no. 1* is (a) none and *layer no. 2* is (7) Carbide or "silicon carbide".

Berthold fails to explicitly set forth limitations upon the RMS surface roughness of the first substrate as indicated in the claim. However, applicant indicates (Pg 4, lines17-19) that "polycrystalline SiC having a typical surface roughness of approximately 0.17 microns can be formed via chemical vapor deposition (CVD)." As indicated above, the silicon carbide layers of the Berthold reference are deposited via chemical vapor deposition.

In addition, Fukushima teaches a method of forming a hermetic seal between two materials by anodic bonding. In the excerpt Figure 1 below, Fukushima lays out the relationship between the quantity of He Permeation or the quality of the hermetic seal as a function of surface roughness.

FIG. 1



"[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."; see

In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation (See In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977)). In the instant case, Fukushima exposes a positive relationship between a decrease in the surface roughness and a corresponding increase in quality of an anodically bonded seal for surface roughness values in the range from 100nm to 400 nm. Therefore surface roughness is deemed a result-effective variable of anodic bonding process. Since typical CVD silicon carbide films have a surface roughness (RMS) of approximately 0.17 microns and optimization of the surface roughness result effective variable would be undertaken through routine experimentation, the immediate claim wherein "the first surface of the first substrate" has a a RMS surface roughness of greater than 0.001 micron and less than about 0.2 micron" is obvious over the prior art.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Berthold and Fukushi as applied in the rejection of Claim 1 above, and further in view of Sarro (Sensors and Actuators A: Physical, 82(1), pp. 210-218, (2000)).

Berthold-Fukushi fails to explicitly limit the PECVD silicon carbide film described above to be of the polycrystalline type as claimed. Sarro teaches that "The possibility of using lower processing temperatures and substrates other than single crystal silicon

...justify the interest in poly-crystalline...SiC layers" (Page 211, §2.2). It would have therefore been obvious to one of ordinary skill in the art practicing the anodic bonding procedure as instructed by Berthold-Fukushi to deposit polycrystalline silicon carbide as taught by Sarro. This would have been obvious to one seeking to reduce processing temperatures for the SiC film deposition and thereby reduce the related equipment and operating costs.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Berthold and Fukushi as applied in the rejection of Claim 1 above in further view of applicants disclosure (¶[0026]).

Berthold-Fukushi fails to explicitly provide the limitation where the surface of the first substrate is caused to be hydrophobic. However, applicant indicates that; "Before bonding, the surface of the second material ***may be*** treated (Step 135). For example, a hydrophobic surface treatment ***may be*** applied to the surface. An effective bond may be formed ***with or without*** ***prior surface treatments***".

> "[A]ny differences between the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)"

Given applicants disclosure that the anodic bond is "effective with or without prior surface treatment", said surface treatment is understood to produce no unexpected result in the properties of the bond. Since the hydrophobic surface treatment provides no unexpected results in the bonding process over untreated surfaces, the immediate claim limitation wherein the method of claim 1 "further comprises causing the surface of the second material to be hydrophobic" is deemed *prima facie* obvious over prior art.

Claim 13, 14, 15, 17, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berthold and Fukushi as applied in the rejection of Claim 1 above in further view of the combined teachings of Wagner (6,550,337), Sarro (Sensors and Actuators A: Physical, 82(1), pp. 210-218, (2000)), Schmidt (Proceedings of the IEEE, 86(6), 1575-1585, (1998)), and Lee (J.Vac. Sci. Technol. B 12(6), 3425-3430, (1994)).

With respect to Claim 13, Berthold-Fukushi fails to set forth a provision wherein a second substrate with elastic modulus greater than that of silicon is contacted to the surface of the first layer and an anodic bond formed between said first layer and second substrate by application of a voltage there between. Berthold-Fukushi also fails to explicitly set forth the limitation wherein the first layer is thinned prior to contact with the second substrate.

Further regarding Claim 13, Wagner (6,550,337) teaches the fabrication of a MEMS based thin film pressure sensing structure (See Figure 2 Excerpt Below) comprising a pressure sensor die (101), a support structure (102), and a plate or header (103). The immediate reference teaches that the pressure sensor die (101) can be a material other than Si (Column 10, Line 1), that the header can be a ceramic (Column 10, Lines 1-2), and that the support structure (102) is typically silicon or glass (Column

4, Line 50). In this MEMS based structure, the support structure serves to mechanically (Column 5, Line 4) and Electrically (Column 5, Lines 12-17) isolate the Die (101) from the header (103). Further, it is indicated that the die (101) and Support structure (102) can be bonded together in wafer form using an anodic bonding process (Column 4, Lines 60-65).

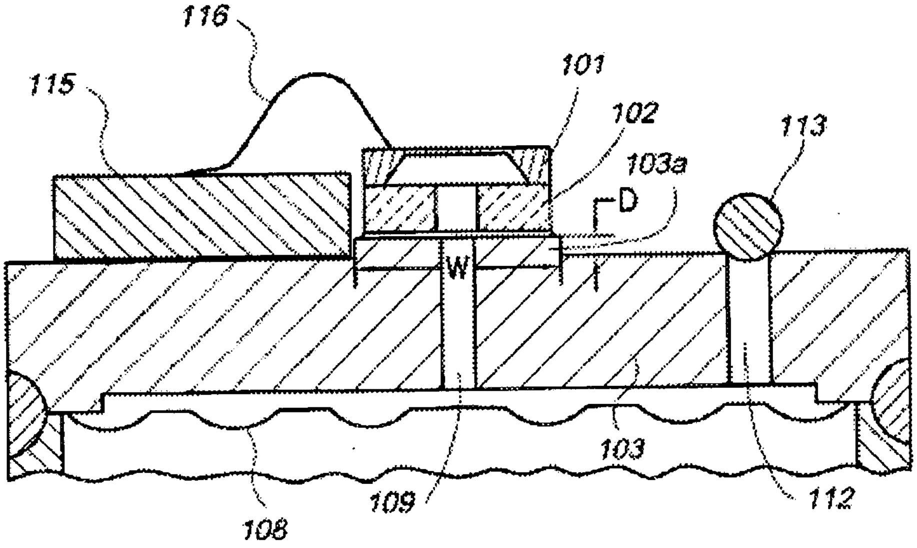


FIG._2A

Sarro (Sensors and Actuators A: Physical, 82(1), pp. 210-218, (2000)) teaches that "silicon carbide is a material that has attracted much attention ...particularly due to its wide band gap, its ability to operate at high temperatures, its mechanical strength and its inertness to exposure in corrosive environments" (pg 210, §1). Sarro continues by indicating that polycrystalline silicon carbide films are suitable for high temperature thermistors and pressure sensors (pg 211, §2.2). As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize polycrystalline silicon carbide as the material of construction for both the pressure sensing die (101) and the header (103). This combination would result in a silicon carbide/glass/silicon carbide type sandwich structure. This would have been an obvious substitution for anyone seeking to construct a MEMS based pressure sensor for application in high temperature or chemically corrosive environments.

Schmidt (Proceedings of the IEEE, 86(6), 1575-1585, (1998)) teaches that wafer-level packaging (or wafer bonding) can be a dominant component in the final manufactured cost of a device. "By achieving package function at the wafer level, it is possible to realize tremendous overall savings in cost since this enables the packaging of a multitude of sensors or actuators simultaneously, eliminating costly individual chip-packaging steps" (pg, 1576, § II). Since packaging at the wafer level could yield "tremendous overall savings" in the packaging of MEMS based structures as taught by Schmidt, it would have been obvious to one of ordinary skill in the art at the time of the invention fabricating the SiC/glass/SiC to utilize said wafer level bonding (e.g. anodic bonding) in order to realize these manufacturing savings.

Further, Lee (J.Vac. Sci. Technol. B 12(6), 3425-3430, (1994)) teaches a new multi layer microstructure fabrication approach utilizing sequential anodic bonding processes to build up a laminate type structure. Lee indicates that "this technique can be used in a wide variety of application s such as packaging, micromechanical devices, 3D very large scale integrated (VLSI) and optoelectronic devices" (pg3425, §1). As depicted in the excerpt figure below, the key to this approach is that sequential anodic bonding procedures can be undertaken to build a multilayer structure without affecting any previously formed anodic bond in the structure. It would have been obvious to one of ordinary skill seeking to package a complex MEMS type structure of the type indicated by Wagner and with the financial benefits of wafer level bonding taught by Schmidt to utilize the multilevel anodic bonding process as indicated by Lee.

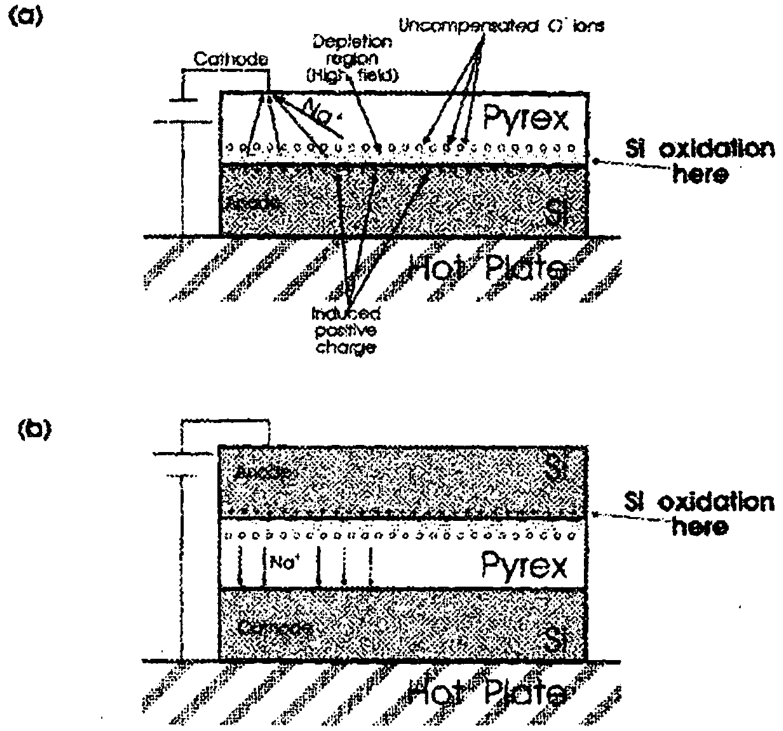


FIG. 4. Schematic illustration of multilayer anodic bonding process.

It would have therefore been obvious to one of ordinary skill in the art building a laminate SiC/glass/SiC type structure of the type indicated by Wagner to combine the teachings set forth above by Sarro, Schmidt, Lee, and Berthold-Fukushi. As a restatement of the afore mentioned key concepts, Lee teaches that multilayer anodic bonding is possible and advantageous for assembly of complex multilayer structures, Berthold-Fukushi teaches that anodic bonding (wafer level bonding) is possible between glass and silicon carbide, Sarro reveals that silicon carbide would be a beneficial substitution in the MEMS pressure sensor structure as taught by Wagner for application in high temperature or corrosive environments, and Schmidt teaches that wafer level, anodic bonding can be undertaken to achieve significant financial benefit in manufacturing costs for said MEMS device.

The aforementioned combination would therefore read on the immediate claim as providing a third material of silicon carbide which is understood to have an elastic modulus greater than about 300 gigaPascals, contacting the first and third materials, and applying a voltage between the first and third materials to cause an effective anodic bond to form between the first and third materials. In accord with the teachings of Berthold-Fukushi, it would be obvious to optimize the RMS surface roughness of the third layer to greater than 0.001 micron and less than 0.15 micron.

With respect to claim 14 and in light of the rejection of Claim 13 above, Schmidt further indicates "wafer thinning" can be utilized to form MEMS based pressure sensors and that such a process results in considerably smaller cavity depth than can be accomplished with bulk micromachined devices. As such, the process of "wafer thinning" is deemed a routine procedure encountered in the fabrication of MEMS based pressure sensor structures. Further, as indicated in the rejection of Claim 13 above, the role of the insulating support structure (102) is to provide mechanical and electrical isolation between the membrane (101) and the header (103). It would be obvious to one of ordinary skill in the art at the time of the invention to utilize the well-established process of wafer thinning to thin the support structure (102) and to optimize the thickness of said support structure to provide the desired level of mechanical and electrical isolation.

Regarding Claim 15 and in light of the rejection of Claim 14 above, applicant indicates (pg 4, ¶ [0018]) that "the glass layer can be thinned to 10.0 □m to provide, for example, a sandwich of a thin glass layer between two anodically bonded polycrystalline substrates". Since the thickness of said glass layer is understood to produce no unexpected result in the properties of the bond, the immediate claim limitation wherein the method of claim 14 "further comprises causing the first material to have a thickness of less than about 10.0 □m" is deemed *prima facie* obvious over prior art.

Claim 17, 19, and 20 are obvious in light of the rejections of Claims 1 and 13 above.

Claim 16 is rejected under 35 U.S.C. 103(a) as obvious over Berthold-Fukushi as applied to Claim 1 above.

In the instant case, Claim 16 is drawn to a device made by the process set forth for the method for anodic bonding as outlined in Claim 1. As such, Claim 16 amounts to a product-by-process claim for the processes set forth in Claim 1.

In the event any differences can be shown for the product-by-process claim 16, as opposed to the product taught by the Berthold-Fukushi reference, such differences would have been obvious to one of ordinary skill in the art as routine modification of the product in the absence of a showing of unexpected results, see In re Thorpe, 227 USPQ 964 (CAFC 1985). As the afore mentioned claim is a product by process claim, it is deemed that "[A]ny difference imparted by the product by process claims would have been obvious to one having ordinary skill in the art at the time the invention was made because where the examiner has found a substantially similar product as in the applied prior art the burden of proof is shifted to the applicants to establish that their product is patentably distinct, ..."In re Brown, 173 USPQ 685, and In re Fessmann, 180 USPQ 324. Further, "[P]rocess limitations are significant only to the extent that they distinguish the claimed product over the prior art product." In re Luck, 177 USPQ 523 (1973).

Response to Arguments

Applicant's arguments filed October 4, 2007 have been fully considered but they are not persuasive.

Applicant argues that the "first substrate" set forth in the Berthold reference is a composite structure comprising a glass wafer with a layer of a second material such as silicon carbide coated thereon. Applicant acknowledges that Berthold teaches that this silicon carbide layer is characterized by elastic modulus of ~430GPa, however Applicant asserts that the composite substrate (silicon carbide layer on pyrex) would display an "effective" elastic modulus which is below the claimed elastic modulus of "about 150 gigaPascals".

Applicants arguments have been carefully considered, however they have been deemed unpersuasive.

In response to the above arguments, it is the Examiners position that the Berthold "first substrate" comprises material layer of silicon carbide which, as admitted by Applicant, is characterized by an elastic modulus of "greater than about 150 gigaPascals". It follows that at least a portion of the first substrate is appropriately construed to have an elastic modulus greater than about 150 gigaPascals. Since at least a portion of Bertholds first substrate has an elastic modulus of greater than about 150GPa, then the first substrate is appropriately construed to "have" said elastic modulus.

To the extent that Applicant argues that the Berthold substrate fails to display an "effective elastic modulus" of at least about 150 gigaPascals, Applicant is advised that such a feature is absent from the rejected claims. It follows that although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Lazorcik whose telephone number is (571) 272-2217. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JLL

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